

**Meeting Notes**  
California State Lands Commission  
Performance Standards Technical Advisory Panel Meeting #4  
Wednesday, July 13th, 2005

**Meeting Attendance**

Marian Ashe - CA Department of Fish & Game	Giselle Johnston – CSLC
John Berge - Pacific Merchant Shipping	Jackie MacKay – CSLC
David Bolland – Association of CA Water Agencies	Sarah Newkirk - Ocean Conservancy (Conference Line)
Bradly Chapman – Chevron Shipping Inc	Greg Ruiz – SERC (Conference Line)
Andrew Cohen - SF Estuary Institute	Lisa Swanson - Matson Navigation
Maurya Falkner – CSLC	Christina Simkanin - Portland State University (Conference line)
Andrea Fox – CA Farm Bureau	Drew Talley – UC Davis
Suzanne Gilmore – CSLC	Lynn Takata – CSLC
Bill Jennings – Delta Keeper (Conference Line)	Kim Ward - SWRCB (Water Quality Division)

**Meeting Materials**

- Comparison Table of Potential Standards (Attachment F)
- Summary Table of other program standards (Attachment C)
- Timeframe of Implementation for other Programs with Standards (Attachment D)
- Supplemental text to Timeframe Implementation for other Programs

**Welcome & Introductions**

Areas of Agreement noted from the Last Meeting (June 22<sup>nd</sup>)

- There was some consensus that a standard must be much better than exchange
- The standards suggested in the Senate Bills (SB 363, SB 1224) are better than exchange
- There is no concrete biological evidence that can guide the selection of a standard number beyond the efficacy of ballast exchange. As far as biological criteria are concerned, the selection thereafter becomes somewhat arbitrary.

Comparison Table of Potential Standards (Attachment F)

The last meeting (June 22<sup>nd</sup>) left off with a grid of potential standards for comparison written up on the whiteboard. These potential standards were copied into a word document with supplemental text provided by Andy Cohen. See text captions included with table for more information.

This meeting began with a review of Comparison Table 1 (Attachment F), and discussion around the origin/basis for the values in each column.

- Untreated Ballast Concentrations: Based on vessels sampled by SERC at the end of voyages.
- Exchanged Ballast: Based on vessels sampled by SERC, and a general 10-fold reduction in the number of organisms observed in properly exchanged ballast (as compared to un-exchanged ballast).
- IMO Convention: Started with biologically based ideas, but final numbers were largely the result of compromise.

- SB 363 & SB 1224: No one was sure what these were based upon, but Maurya mentioned that developers of these bills have been in consultation with the Coast Guard.
- U.S. Position at IMO conference: U.S. Scientists were gathered together to debate where the “numbers” should fall. The proposed standard was based on a 4 orders of magnitude decrease from the number of organisms observed in unexchanged ballast water.
- Natural Invasion Rate: Based upon Andy Cohen’s estimates of a natural invasion rate, and an assumed 1:1 relationship between propagule pressure and invasion success. (See below section on Natural Rate of Invasion)

#### IMO Convention Standards and USCG Federal process

A question was raised about whether the IMO Convention standards could be reached by ballast water exchange (John Berge). Based on SERC data measuring both exchanged and un-exchanged tanks on vessels, exchange has a significant effect, reducing organisms approximately 90%. A paper will be coming out in August 2005 in *Frontiers of Ecology* that examines the effect of the IMO standard when compared to exchange. Approximately 10-20% of vessels could meet the IMO standard using the present process of exchange, with 80 - 90% unable to meet the IMO standard through exchange alone.

An important point to note is that exchange often exchanges coastal organisms for open ocean species, but vessels will not get “points” for this effect with the IMO (or other) standards (Greg Ruiz). Zooplankton and phytoplankton are generally, but not always, found in lower densities in the open ocean when compared to coastal or estuarine areas. Species compositions are also very different between the two environments. Ballast water exchange is expected to reduce overall numbers of organisms found in a ballast tank, although exchange studies have shown that coastal organisms can be replaced with open-ocean species that are presumed to be ill suited to survive in coastal areas. If a standard only considers the total number of organisms in particular size classes, it is still possible that a vessel may exceed a standard such as in the IMO convention after performing exchange, even though the number of coastal/estuarine species is very low.

Another question was answered about the status of Federal performance standards and California’s involvement. The USCG is currently developing a rulemaking package for performance standards of ballast water treatment. Any state, organization, or individual is excluded from the process outside regular public hearings. They anticipate publishing a Notice of Proposed Rulemaking by January 2006, but this may get delayed due to other obligations such as homeland security etc. Industry representatives voiced the need for consistency between federal and state regulations.

Throughout the meeting, it was suggested that CA adopt the federal standard once it is made public or adopt the standards proposed by Senate Bills 363/1224. These were suggested as interim standards that could be reviewed periodically as technological capabilities advance and new information becomes available. Marian Ashe mentioned that the Senate Bills and the USCG position (at the IMO) seem reasonable biologically, and would account for consistency with other states. A few participants agreed that it would be feasible to make ‘zero’ or the ‘natural rate of invasions’ an ultimate goal, but use the federal position or senate bills as interim standards to begin the process. During discussion, several participants agreed that we should recommend either the IMO or Federal standards for the interim, and revisit the standards with periodic review. An example of this might be to recommend:

Senate Bills (363/1224) as interim standards before creating standards based on:

Zero detection or the estimated Natural Rate of Invasion (Once more research is done to establish firmer estimate of this rate)

#### Discussion on <10 micron size class:

There was some discussion around the smaller size classes for viruses and bacteria. Questions were raised about how these standards were selected in other programs. Greg Ruiz responded to a question on how the microbe standard was selected. He understood that the IMO and Senate Bills (SB) went forward with human health indicators based on water quality standards. There are risks certainly posed to human health, consumable fisheries, as well as invasive effects on ecosystems, which the IMO/SB standards don't seem to address for microbes. Certainly there is a risk posed by microbial invasions (i.e. disease), but the question remains whether microbes are being transported by ships.

Though no consensus was reached regarding recommendations for this size class:

- There was general agreement that this was a human health based standard, and not based on invasion risk.
- A reading of the legislation indicates that the “protection of beneficial uses” must be considered with this TAG, which could include recreational uses.
- It was suggested that the group “park” the issue of the microbe >10 micron size class standard for now, and tackle the larger size classes first.

#### Economic Considerations

The discussion became somewhat circular when attempting to reach consensus about timeframe and possible interim standards. As a number of participants seemed to be moving towards a framework to recommend treatment standards, Andy Cohen raised several points:

- California is at a point to develop standards for ballast water treatment. As they get implemented, they will likely stay in place for a long time, so we don't want to make the standards too lenient.
- As mentioned in prior meetings, economic feasibility should be considered. Andy feels strongly that we need to assess the cost of treatment and what the industry can afford.
- Shore side treatment proves that technology is highly capable of treating ballast water to the level of drinking water standards.

David Bolland and Marian Ashe responded to Andy's points regarding economic evaluation. It was suggested that economics should not drive the standard, but that once the standard is set, it should be left up to the industry (including technology developers) to come up with acceptable competitive costs. Additional comments were that a standard should be set based on what is biologically protective, which would drive the development of appropriate technology.

Andrea Fox added that she would agree to evaluate the costs of treatment versus what the industry can afford. As discussion continued, it was decided that economic feasibility is important and should be considered. Most participants agreed that economic evaluation should be considered further once the standards are decided upon.

#### Implementation Timeframe and Interim Standards

The concept of interim standards was discussed throughout the meeting. It was determined that interim standards can be written into legislation or regulations. An example could be a periodic review to revisit how well technologies have progressed towards reaching an interim step or ultimate goal standards.

Another perspective shared by Sarah Newkirk was that zero would be the most appropriate standard to recommend with a final implementation date. She felt that California has always been a worldwide leader in environmental policy and should therefore push for a more stringent

standard than the federal ones. At another point, Sarah indicated that one compromise could be to settle for the US position at the IMO convention as interim standards.

Bill Jennings added that standards for vessels ought to be strict because the timeframe set now will be in effect for a long time. Response from the group acknowledged this as a potential issue, and decided recommendations could include that standards be re-evaluated periodically. Standards could then be modified if it is determined they are too lenient or too strict.

Brad Chapman pointed out that the group needed to consider vessel logistics and the implementation timeframe. Due to the intense dry-docking schedules, a vessel goes into dry-dock only once every five years. Dry-dock is the only place retrofit for treatment technologies can happen (Please note there are exceptions; as an example, Princess Cruises was able to retro-fit a ballast water treatment system while underway). Therefore, if the first implementation date is 2016 (as in the SB's), then technologies must be approved and ready for retrofit on some vessels starting in 2011, which is 6 years from now. For the 2012 date in the SB, technologies must be ready by 2007, 2 years from now. Dry-docks are currently overwhelmed by the number of vessels, so it isn't feasible to get them into dry-dock more often than every 5 years, as required by law.

#### Definition of a Zero Standard

Most participants did agree that zero would be the most protective standard for ballast water treatment, however there was little consensus about the feasibility of implementation for such a standard. Discussions of how zero might be defined were as follows:

- Sarah Newkirk felt that zero would be a good standard given the lack of information about technological capabilities and biological efficacy, because we know zero would be protective.
- Bill Jennings added that waste water treatment technologies allow water to get down to "detectable zero." He suggested to first recommend standards according to the "natural invasion rate," and then we should move towards zero.
- Detectable zero as a standard may be feasible; however detection limits are always changing so this would always be a moving target. Technologies may never be able to get to measure a "real zero." A possible solution could be to adopt standards measured to a "lowest detectable value."
- Kim Ward added that a definition for zero could be "no discharge" – some vessel classes do not need ballast. Comments from industry representatives added that this is true for only a few classes, container ships and select tankers for example.
- One suggestion was to make zero the ultimate goal for standards, and develop interim standards until zero is more technologically feasible (see section above: Implementation Timeframe).
- If a zero discharge standard is recommended as the ultimate goal but does not include implementation dates, it could remain the "ultimate goal" indefinitely without any real effect.
- It was agreed by several others that there should be interim goals/dates as part of the gradual process to reach the ultimate goal. Otherwise, such a goal would be unenforceable.

#### Potential Definitions of "Zero"

- No ballast discharge
- Lowest detectable
- No invasions as a result of ballast water discharge
- Approximations of the "natural" invasion rate

### Estimated Natural Rate of Invasion

In discussing Attachment F, several questions came up (in Andy's absence) regarding the rationale used to approximate the natural rate of invasion:

- Does this estimate include other sources of invasions beyond ballast water?
- Is this 'natural rate of invasion' based on which historical invasion rates?
- The scientific basis used to establish a natural rate of invasion appears to be based on several assumptions, providing a fairly high level of uncertainty.

Andy Cohen stated that his "natural invasion rate" based standards are the only standards presented thus far with any scientific basis. Several members disputed the scientific basis for the theory, and requested an explanation. Main points from Andy's explanation were as follows:

- Goal is to bring ballast water invasion rates down to the approximate natural rate of invasion. If we know the current ballast water invasion rate and the current rate of ballast discharge, we can theoretically reduce the amount of organisms discharged to an amount approximating a 'natural rate.'
- Natural invasions have historically happened in rare chance events such as rafting
  - Approximately 1 invasion per million years
- Humans are moving organisms beyond their natural boundaries
- To estimate a natural invasion rate, we can look at species or evolutionarily related species that are observed on geographically separated islands or continents thought to not have been transported by humans.
  - Approach was to gather published and unpublished data sources
  - Biota on the east and west side of the Pacific Ocean
  - How many species/related species are common to both areas, and what is the distribution
  - Data on this is very scarce or nonexistent for most taxa
  - Information on mollusks was used to extrapolate for other taxa
  - Timeframe examined was approximately 3 million years ago to present
  - To be conservative, it was assumed that no more than 100 organisms per 1 million years were naturally established. Providing the basis for a natural rate of invasion of 1-10 organisms per 10,000 years.
- Current invasion rate was based upon:
  - The time period between 1960 and 1995: 4 invasions per year were found by all possible vectors including ballast water.
  - Estimated rates of ballast water invasion in SF Bay (Andy's Science paper). These were estimated by looking at known exotics (not cryptogenic) for which ballast is the only possible vector and for which ballast is a likely vector (but for which other vectors were possible as well).
  - An estimated 50%-90% of SF invaders came in ballast water, which indicates approximately 2-4 invasions to SF bay via ballast water a year.

Comments following the overview of a 'natural invasion rate':

- Discomfort was expressed because of reliance on only mollusk data
- Seems like many other taxa beyond mollusks would have had contributions to historical natural invasions. Therefore, this estimate for a natural invasion rate may be low.
- Greg Ruiz mentioned that some of the best numbers he has found with regard to natural invasion rates were based on gastropods in papers by Geerat Vermeij. Of the 250 endemic species found in Hawaii, 11 have penetrated the Pacific US mainland. He expressed two concerns:

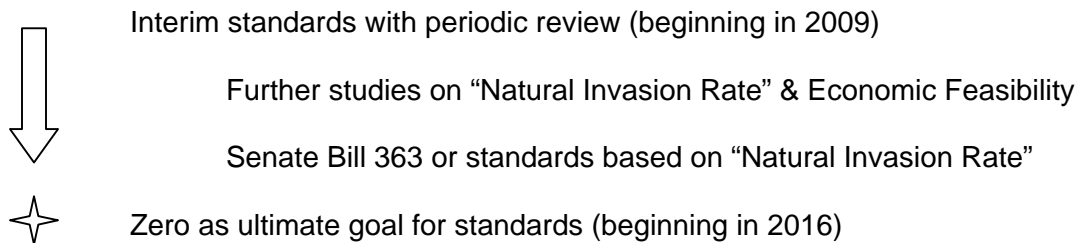
- It's extremely unclear what happens to totals when you sum across other taxonomic groups.
  - It's not clear how the natural "rate" varies through time or across organismal groups.
- Andy and Greg agreed to further discuss the subject of Natural Invasion rates at a later date.

#### Areas of Agreement

The panel could recommend several parts if necessary:

- 1) Set an ultimate goal (possibly zero discharge, or some other ultimate goal)
- 2) Incremental review of treatment technologies capabilities and/or
- 3) Interim standards until advancement of science and technology

A possible model for the recommendations:



Action Items before next meeting:

- Distribute information on the status of Michigan BW permit process

Topics for Next meeting:

- Address standards for zooplankton and phytoplankton first, then discuss the <10 µm size class
- By 2016 it was agreed that some standard will be in effect:
  - Natural invasion rate
  - Concept of zero detection
  - Consider USCG proposed standard

**Adjourn:** 1:15 pm